



Grand Junction, Colorado, Processing Site and Disposal Site

FACT SHEET

This fact sheet provides information about the Uranium Mill Tailings Radiation Control Act of 1978 Title I processing site and disposal site at Grand Junction, Colorado. These sites are managed by the U.S. Department of Energy Office of Legacy Management.

Site Description and History

The former Grand Junction Processing Site, historically known as the Climax uranium mill, occupies 114 acres at an elevation of about 4,600 feet above sea level in the broad, arid Grand Valley in west central Colorado. The former millsite is located on land owned by the City of Grand Junction in an industrial area along the north bank of the west-flowing Colorado River. The facility began in 1899 as a sugar beet mill. In 1950, the Climax Uranium Company reconfigured the original site and operated the facility as a uranium and vanadium mill until 1970. During 19 years of operation, the mill produced 2.2 million tons of radioactive tailings, a predominantly sandy material.

From 1950 to 1966, tailings were available to private citizens and contractors, who used them as fill and as a component of concrete and mortar. Tailings were hauled to more than 4,000 private and commercial properties in the Grand Junction area. In 1966, concerns about potential adverse health effects from mill tailings prompted the Colorado Department of Health to sample the tailings for radon-222, and preliminary results indicated elevated levels. Although that finding caused Climax to discontinue release of tailings from the site, an estimated 300,000 tons of tailings containing radioactive uranium daughter products had been removed by that time.

During 1970 and 1971, the Climax Uranium Company demolished 8 of the 12 main mill buildings at the processing site. Equipment that could be decontaminated was sold; equipment that could not be decontaminated was buried in the tailings pile along with building rubble. Demolition of the remaining buildings, except the old sugar beet warehouse, was completed in 1989. The sugar beet warehouse has since been cleaned, sold to the private sector, and is now located outside the fence separating the city-owned property from adjacent private properties along the northern boundary of the site.

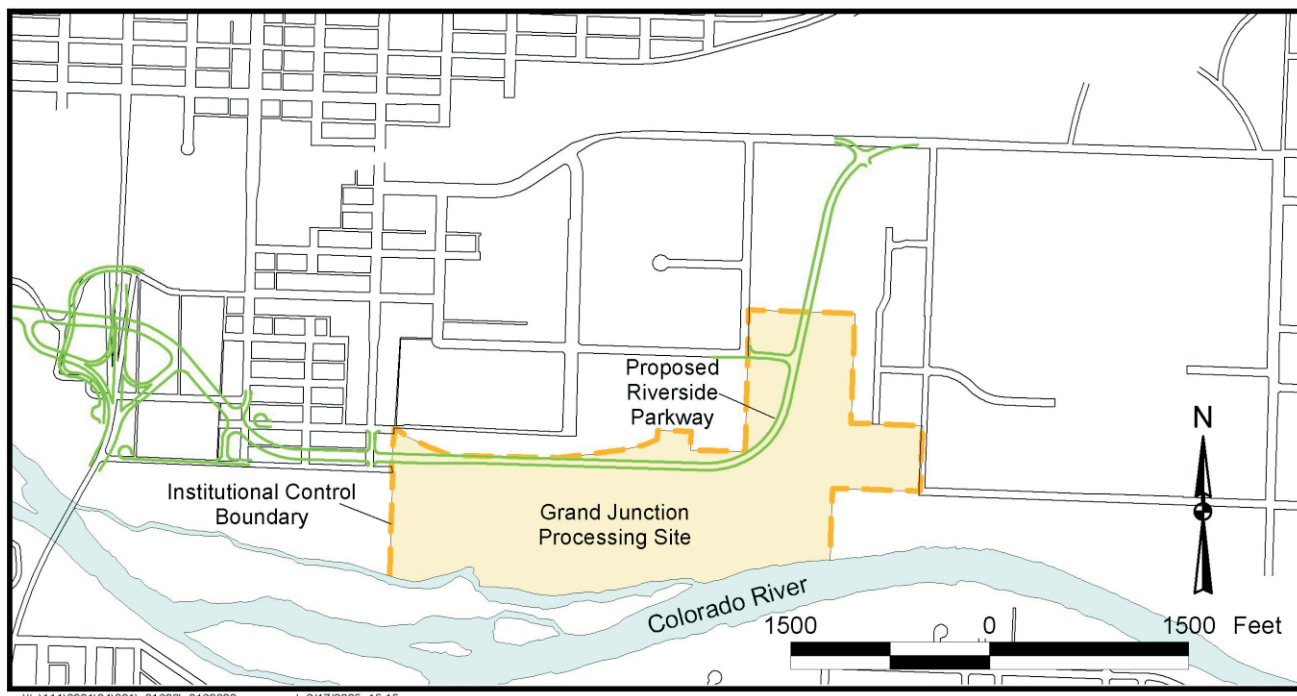
Surface remediation of the processing site and contaminated private and commercial properties,



Locations of the Grand Junction, Colorado, Sites

known as vicinity properties, began in the mid-1980s. The U.S. Department of Energy (DOE) conducted radiological surveys at all vicinity properties and remediated those where millsite-related radium-226 or radon levels exceeded established maximum concentration limits. Tailings and other contaminated materials removed from vicinity properties were stored temporarily at the processing site.

Construction of the Grand Junction Disposal Site, at that time called the Cheney disposal cell, began in 1990 about 18 miles southeast of Grand Junction. All contaminated materials from the old processing site and all vicinity property materials temporarily stored at the site had been transported to the disposal cell by the end of 1994. About 4.4 million cubic yards of contaminated materials were placed in the cell. DOE completed cleanup of vicinity properties in 1998 under the Uranium Mill Tailings Remedial Action Project.



Grand Junction Processing Site Institutional Control Boundary and Proposed Riverside Parkway (shown in green)

The three main hydrogeologic units beneath the former processing site are the unconfined alluvial aquifer (the uppermost aquifer), the underlying aquitard composed primarily of shale units in the Cretaceous Dakota Sandstone Formation, and the confined aquifer in sandstones of the Dakota Sandstone.

The alluvial aquifer is composed of unconsolidated clays, silts, sands, gravels, and cobbles. Groundwater is unconfined in the alluvial aquifer; depth to the water table ranges from zero near the river to approximately 20 feet at the northern boundary of the site. The saturated thickness of the aquifer ranges from 5 to 20 feet. Groundwater generally flows west-southwest toward the Colorado River.

Groundwater in the alluvial aquifer beneath the site is contaminated as a result of past milling activities. Contamination extends approximately 3,300 feet downgradient from the site. Site-related contaminants in groundwater discharging to the Colorado River are quickly diluted and have no measurable effect on river water quality.

Regulatory Setting

Congress passed the Uranium Mill Tailings Radiation Control Act (UMTRCA) in 1978 (Public Law 95-604) and DOE remediated 22 inactive uranium-ore processing sites under the Uranium Mill Tailings Remedial Action Project in accordance with standards promulgated by the U.S. Environmental Protection Agency in Title 40 *Code of Federal Regulations* (CFR) Part 192. Subpart B of 40 CFR 192 regulated cleanup of contaminated groundwater at the processing sites. The radioactive

materials were encapsulated in U.S. Nuclear Regulatory Commission (NRC)– and state-approved disposal cells. The NRC general license for UMTRCA Title I sites is established in 10 CFR 40.27. The Grand Junction Disposal Site will be included under the general license when the cell is completed.

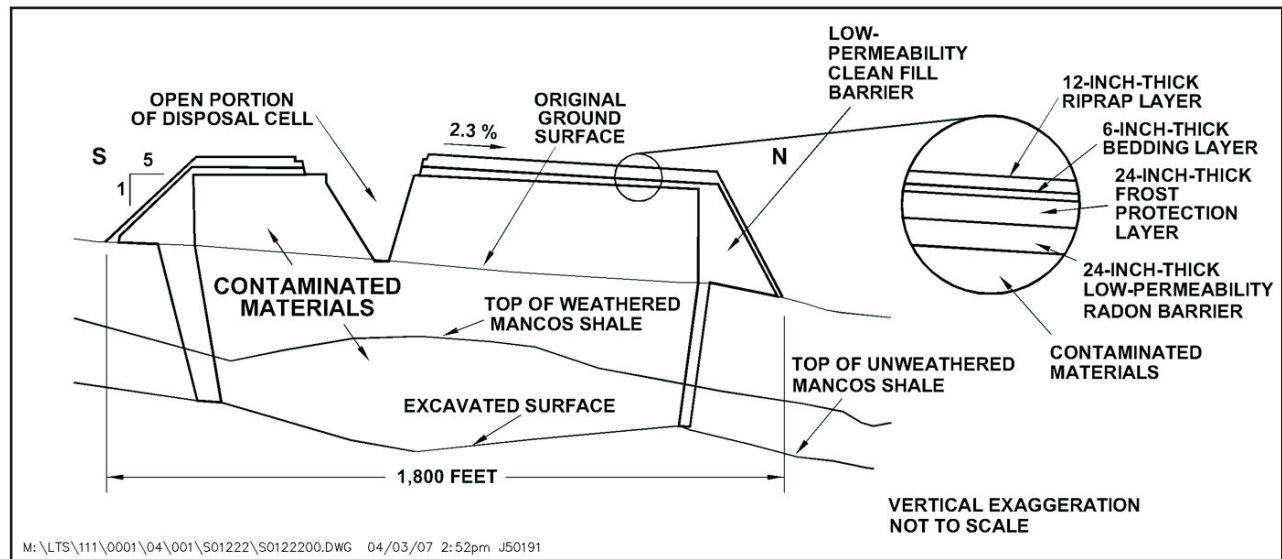
Processing Site

All surface and subsurface soils at the processing site were cleaned up to meet the standards in 40 CFR 192. After cleanup, the site was contoured and seeded. The State of Colorado transferred ownership of the property to the City of Grand Junction through a quitclaim deed in March 1997.

The City named the former millsite property Las Colonias Park for an earlier Latino community that lived in that part of the city. The Grand Junction Parks and Recreation Department administers the site for the City. The only property development to date consists of a concrete-paved riverfront trail constructed on a flood-control dike along the Colorado River. However, the City and Mesa County plan to construct a major three- to five-lane parkway around the southern part of Grand Junction. The City's portion of the road, named Riverside Parkway, will traverse the millsite property (see figure above). Construction began in fall 2005 and is scheduled to be completed in about 2009.

Compliance Strategy

The groundwater compliance strategy proposed for the Grand Junction Processing Site is no remediation and the application of supplemental standards based



South-North Cross Section of the Disposal Cell

on EPA's criterion of limited-use groundwater. Supplemental standards may be applied at locations where groundwater is classified as limited use (not a current or potential source of drinking water) because it meets any of several criteria. At the Grand Junction Processing Site, groundwater is classified as limited use because of widespread ambient contamination not related to milling activities that cannot be cleaned up using treatment methods reasonably employed in public water systems (40 CFR 192.11[e][2]). Groundwater in the alluvial aquifer at the site and at background locations is not a present or potential source of drinking water because it contains elevated concentrations of naturally occurring uranium and selenium.

Institutional Controls

Institutional controls are safeguards that protect human health and the environment by restricting access to contaminated groundwater beneath the Grand Junction Processing Site. Preliminary data indicate that natural processes such as dilution, dispersion, and sorption will attenuate concentrations of site-related contaminants in the groundwater. But even if all site-related contaminants flush from the site, the groundwater will remain unacceptable for human consumption because of its naturally poor quality.

Language in the deed transferring the millsite property to the City states that the City agrees "not to use groundwater from the site for any purpose, and not to construct wells or any means of exposing groundwater on the property unless prior written approval of construction plans, designs and specifications is given by the Grantor [the State] and the U.S. Department of Energy."

The processing site property and land downgradient of the site are within the city limits. The City of Grand Junction zoning and development codes prohibit the use of groundwater within the city limits as drinking water,

and landowners are required to tap into city water lines for a potable water supply. Wells are permitted for other purposes, such as irrigation and livestock watering. Although groundwater upgradient and downgradient of the site is acceptable for uses other than drinking water, water at the site itself is of lower quality.

Disposal Site

The Grand Junction Disposal Site is located about 18 miles southeast of Grand Junction. Bureau of Land Management property surrounding the 360-acre site is used seasonally for grazing. The nearest residence is approximately 2 miles north of the site. The site is fenced with a locked gate to control access. Postings restricting entry are also located at the site.

The 94-acre cell is located on a westward-sloping pediment surface at an elevation of about 5,200 feet above sea level. The surface consists of about 40 feet of alluvium, colluvium, and terrace gravels underlain by a 700-foot-thick sequence of Mancos Shale. DOE chose the disposal site location on the basis of remoteness, lack of significant groundwater, and the thick, impermeable layer of Mancos Shale underlying the site.

Part of the Grand Junction Disposal Cell was completed in 1994; the remainder of the cell remains open until it is filled or until 2023, whichever comes first, to receive additional low-level radioactive material expected from such sources as unremediated tailings buried along utility lines.

The open portion of the disposal cell can accommodate as much as 250,000 cubic yards of additional material. This open cell measures 1,200 feet by 750 feet and is approximately 30 feet in depth.

NRC has conditionally approved the closed portion of the disposal cell, but the disposal site will not be fully licensed until the open part of the disposal cell is closed.

Disposal Cell Design

The disposal cell is 2,400 feet by 1,800 feet and contains 4.4 million cubic yards of tailings and vicinity property materials. Tailings were placed in compacted layers to a height of 40 feet above the original ground surface. It is approximately 70 feet deep from its highest to its lowest point.

The cell cover is a multicomponent system designed to encapsulate and isolate the contaminated materials. The cover consists of (1) a low-permeability radon barrier (first layer placed over compacted tailings), (2) a frost protection layer, (3) a bedding layer, and (4) a layer of riprap. The cell design promotes rapid runoff of precipitation to minimize leachate. Precipitation runoff is collected and directed away from the disposal cell by riprap-armored aprons that surround the cell.

Legacy Management Activities

DOE is responsible for ensuring that the selected groundwater compliance strategy at the Grand Junction Processing Site continues to be protective of human health and the environment. As a best management practice, DOE conducts a limited groundwater monitoring program and will collect samples from selected monitor wells annually through 2006, then once every 5 years thereafter. Sampling at 5-year intervals will continue until all analytes are below their respective maximum concentration limits, within the range of background values, or until the monitoring program is modified.

DOE manages the Grand Junction Disposal Site according to a site-specific Long-Term Surveillance Plan to ensure that the disposal cell systems continue to prevent release of contaminants to the environment. Under provisions of this plan, DOE conducts annual inspections of the site to evaluate the condition of

surface features, performs site maintenance as necessary, and monitors groundwater to verify the continued integrity of the disposal cell. The encapsulated materials will remain potentially hazardous for thousands of years.

In accordance with 40 CFR 192.32, the disposal cell is designed to be effective for 1,000 years, to the extent reasonably achievable, and, in any case, for at least 200 years. However, the general license has no expiration date, and DOE's responsibility for the safety and integrity of the Grand Junction Disposal Site will last indefinitely.

Contacts

Site-specific documents related to the Grand Junction Processing Site and Disposal Site are available on the DOE Office of Legacy Management website at <http://www.LM.doe.gov/land/sites/co/gj/gjp/gjp.htm> (processing site) and at <http://www.LM.doe.gov/land/sites/co/gj/gjd/gjd.htm> (disposal site).

For more information about DOE Office of Legacy Management activities at the Grand Junction Processing and Disposal Sites, contact

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